

SUMMER 2016

in the Field

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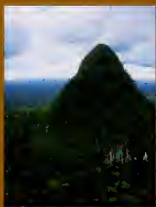
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ON THE COVER

Rising above the Amazonian plain, an extinct volcano known as “El Cono” symbolizes Peru’s new Sierra del Divisor National Park. *The Field Museum* played a vital role in the park’s creation. See pages 4 and 5.

ALLIARO DEL CAMPO

dear member

After three years at the Museum, I continue to find—on a daily basis—some fact, specimen, or story that inspires pride and respect. Very few of these instill more pride than our Women in Science program. It is a very effective and powerful program, and it is at the very heart of what we do.

The promotion of science and scientific education are two of our most important goals at the Museum. Women in Science shares these goals. Investing in and growing the future of science is why we cultivate our astonishing collections. Women in Science also supports and fosters this aim. Translating our scientific discoveries into action for the benefit of society is what we do so well here at The Field. And this, too, is part of the work of Women in Science.

This issue of *In The Field* highlights some of the exhibitions, programs, achievements, and individuals that represent the contributions of women at *your* wonderful Museum. Like all the work that takes place at The Field, we couldn’t do these things without the support of members like you. Thank you.

I would also like to recognize our hard-working Women’s Board, which is celebrating its 50th anniversary this year. We are deeply grateful for their continued remarkable support.

RICHARD W. LARIVIERE, PHD

PRESIDENT AND CEO



Richard Lariviere with
Field Museum scientists
Corine Vriensendorp, PhD,
and Corrie Moreau, PhD.

The Field
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GN2208.1000 / JOHN WEINSTEIN



WOMEN OF VISION

THIS SUMMER, THE FIELD MUSEUM INVITES VISITORS TO EXPERIENCE THE INFLUENTIAL WORK OF 11 AWARD-WINNING FEMALE PHOTOJOURNALISTS in *Women of Vision: National Geographic Photographers on Assignment*.

The exhibition presents nearly 100 photographs that underscore the role of women photojournalists as innovative storytellers who are making a difference through their work. Included are moving depictions of far-flung cultures, compelling illustrations of conceptual topics, and arresting images of social issues, such as child marriage and 21st-century slavery.

"The Field collects the physical objects of human cultures around the world, so to us, contemporary photography offers a great counterpoint in ways to understand cultures," says the Museum's Director of Exhibitions Jaap Hoogstraten.

"We think it's interesting that, worldwide, female photographers often have access to community spaces that their male colleagues do not."

Women of Vision was curated by National Geographic Senior Photo Editor Elizabeth Krist who had the challenging task of choosing a selection of images to best represent the broad portfolios of the 11 extraordinary photographers represented in the exhibition:

- Lynsey Addario
- Kitra Cahana
- Jodi Cobb
- Diane Cook
- Carolyn Drake
- Lynn Johnson
- Beverly Joubert
- Erika Larsen
- Stephanie Sinclair
- Maggie Steber
- Amy Toensing

In addition to the photographs, video vignettes present first-person accounts that reveal the photographers' individual styles, passions, and approaches to their craft.

"This exhibition not only features the work of exceptional female photographers, but highlights places and topics that often receive little attention," says Associate Curator Corrie Moreau, PhD, the founder of Field Museum Women In Science. "I am thrilled the Museum is able to host this important and beautiful collection of photographs."

Women of Vision opens May 18 and closes September 11. Members and donors are invited to the exclusive preview days from Saturday, May 14 through Monday, May 16, during normal Museum hours. No reservations needed, just check in at the membership desk. **ITF**



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A VISION REALIZED: SIERRA DEL

IT'S ONE OF THE MOST ASTONISHING SCENES IN THE AMAZON, A FEVER DREAM OF A DIORAMA. HOT SPRINGS STEAM IN THE FOREGROUND, FANNED BY THE WINGS OF SCARLET MACAWS ATTRACTED TO THE NUTRIENT-RICH WATERS; rainforest stretches as far as you can see

in every direction, dotted here and there with the thatched roofs of forest communities; and off on the horizon a series of mountains looms up from the Amazonian plain.



ROBIN FOSTER



ECCO 20106 / HOMER SANDOVAL

This is the setting of Peru's newest protected area—the three million-acre Sierra del Divisor National Park—created in November 2015 to a chorus of cheers from around the world.

The cheers were especially loud in The Field Museum's Keller Science Action Center.

This comes as no surprise to anyone who has visited *Restoring Earth*, the permanent exhibition in the Abbott Hall of Conservation that tells the story of the Museum's rapid inventory team. Over the last 16 years, this close-knit group of social scientists and conservation biologists has been leading expeditions in the Andes-Amazon region to build arguments for protecting the world's richest forests.

Sometimes it's easy to forget, as you wander through *Restoring Earth*, that this particular exhibition isn't about the past. The news about Sierra del Divisor is a vivid reminder that the work it describes is happening right now. Today, this morning, some of the staff members walking up the steps of the Museum are there for the sole purpose of protecting tropical forests.

Imagine for a minute that their offices have glass walls, like the Pritzker Laboratory for Molecular Systematics and Evolution in the Daniel F. and Ada L. Rice DNA Discovery



ECCO 20126 / HOMER SANDOVAL

Center, and you can stand and watch their day-to-day work. In the case of Sierra del Divisor, what you would see spans 14 years and includes everything from helicopter overflights to endless meetings with conservation partners in Peru, from amphibian surveys in remote campsites to workshops in riverside communities. You'd see cabinet after cabinet of plant specimens in the herbarium. You'd see years in which the team expects the park's designation to happen any minute—and years in which it almost seems to have slipped out of reach, as illegal loggers and miners and coca plantations encroach on the vision of a great national park. What you'd *never* see is the team not pushing to make that vision a reality.

DIVISOR NATIONAL PARK



By Nigel Pitman, PhD, Mellon Senior Conservation Ecologist,
Keller Science Action Center



Even after the park finally came into being late last year, there was little time to slow down and savor the good news. Anyone peering through the rapid inventory glass in the three months after Sierra del Divisor was declared a national park would have seen us setting up camps and visiting indigenous communities in another corner of Amazonian Peru in preparation for our next rapid inventory; celebrating the creation of another new park that the Museum had been pushing for high in the Ecuadorian Andes (if you're keeping count, that's number 18); pouring over satellite images and sketching preliminary vegetation maps; ordering waterproof field books and inflatable rafts; coordinating with team members in Colombia and Peru; and working our way through the unending checklist of logistical details that putting together a 40-person expedition to a remote Amazonian site entails.

It's that hard work—shared by dozens of partners—that makes it possible to protect the world's most fantastic landscapes, like Sierra del Divisor.

As MacArthur Senior Conservation Ecologist and Director of the Andes-Amazon Program Corine Vriesendorp, PhD, explains, "This is the culmination of more than ten years of numerous organizations working together—that's how you make conservation happen." Vriesendorp and her team recently returned from another spectacular wilderness area in the Peruvian Amazon and are hard at work protecting that place. **ITF**

Major Support of Andes-Amazon Program: The Boeing Initiative for Conservation and Community at The Field Museum, the Gordon and Betty Moore Foundation, and the John D. and Catherine T. MacArthur Foundation.

For more information about Sierra del Divisor, visit:

fieldmuseum.org/sierra-release

fieldmuseum.org/rbi-sierra

Supporting The Field: The Rosenthal and Glasser Families

Interviewed by Cheryl Aponte, Major Gifts Officer

FOR NEARLY 30 YEARS, THE ROSENTHAL AND GLASSER FAMILIES HAVE GENEROUSLY SUPPORTED THE MARIE LOUISE ROSENTHAL LIBRARY through their family foundation, the D&R Fund.

In The Field recently spoke with Louise (Rosenthal) Glasser and James Glasser, retired chairman and CEO of GATX Corporation, about their family's support of the Museum's Library and its collections.



*Left to right: Louise Glasser,
James Glasser, Babette Rosenthal*

ITF: *Louise, please tell me about your mother (Marie Louise Rosenthal) and her relationship with the Museum's Library.*

Louise: My mother took classes at the Newberry Library to learn how to care for books and how to bind them. She was *not* good at binding [laughs], but she was very good at repairs and making boxes. I can go to the Rare Book Room in the Rosenthal Library and point her boxes out to you; she was that good at it. She first became involved with the Library in the early 1970s and was there two days a week. In her later years (she passed away in 2003 at age 95), she would still go to the Library, but not quite as often. Working with books, working at the Library, was her love.

ITF: *You recently announced a very significant endowment commitment for the Library. Why is this important to you?*

Jim: We believe strongly in endowments, and we know it's difficult for organizations to secure. Sam and Marie Louise Rosenthal (my in-laws) liked giving something that was needed, but not easy to get. It just made a lot of sense.

Louise: My father liked to do things that other people don't find "attractive." He liked endowments.

ITF: *What do you and your sister-in-law Babette Rosenthal hope your gift will accomplish?*

Louise: We hope it will keep the Library stable, productive, and healthy in perpetuity.

Jim: We gave the Library money for things it needs. It is up to Christine Giannoni [library director] and her staff to decide what is most needed.

ITF: *What do you like best about The Field Museum?*

Jim: I enjoy going and just wandering around. I always find something new. **ITF**



*Christine Giannoni, Museum Librarian &
Head of Library Collections, shares an
illustrated portfolio with school kids.*

PHOTOS BY JOHN WEINSTEIN



MONSTER MYSTERY SOLVED

By Kate Golembiewski, Public Relations Coordinator

THREE HUNDRED MILLION YEARS AGO, THE CHICAGO AREA WAS A SWAMPY COASTLINE BORDERING A TROPICAL SEA, home to aquatic animals called Tully monsters. The remains of these enigmatic creatures are now recognized collectively as the official state fossil of Illinois.

For decades, scientists weren't sure what kind of animal Tullies actually were. With their tube-shaped bodies, snouts capped with toothed jaws, triangular tail fins, and eyes at the ends of rigid stalks, these "monsters" didn't seem to fit neatly into any branch of the evolutionary tree of life. Experts had argued that *Tullimonstrum gregarium* (named

after amateur fossil collector Francis Tully) was related to everything from marine worms to shell-less snails.

But The Field Museum's Scott Lidgard, PhD, and Paul Mayer, working with colleagues from Yale University and the Argonne National Laboratory, have solved the mystery. This year, they announced the monsters were actually jawless fishes, distantly related to lampreys living today.

The project relied on The Field's collection of Tully monster fossils—with more than 1,800 specimens, the biggest in the world—as reference material for scientists to compare and analyze the animals' features. A selection of fossils was scanned at Argonne Labs using a high-energy electron beam, which revealed new details about these mysterious creatures and helped pinpoint their position on the tree of life.

"This discovery is a beautiful example of how science works to solve the mysteries of nature, and how museums fit in," said Lidgard, Curator of Invertebrate Paleontology.

"It never could have happened if we didn't

have collections managers and curators maintaining our



Physicist Carmen Soriano Hoyuelos, PhD, (Argonne Labs) and Victoria McCoy, PhD, (postdoc from Yale University) attach Tully monster fossils to a high-energy electron beam scanner.

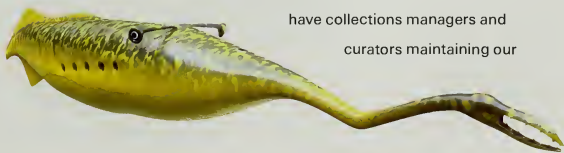
collections and making digital records of our specimens to make it easier for our researchers to study them."

"When I talk to school groups, I use the Tully monster as an example of a mystery that paleontologists have been trying to solve ever since it was first discovered," said Mayer, the Museum's Fossil Invertebrates Collections Manager. "Now I'll have to change my talk to say the Tully monster highlights the importance of how people from different institutions and scientific backgrounds can work together using new technologies and museum collections to solve a mystery." **ITF**



Scott Lidgard, PhD, (Field Museum) and Erin Saupe, PhD, (postdoc from Yale University) prepare Tully monster fossils for scanning.

IMAGE CREDITS: ARGONNE NATIONAL LABORATORY / MARK LOPEZ (LAB PHOTOS); FIELD MUSEUM / PAUL MAYER (FOSSIL); ILLUSTRATION BY SEAN MACMAHON





MATT POTENSKI

The Intimate Lives of Sharks

By Franck Mercurio, Editor

EVERY TWO YEARS, FEMALE LEMON SHARKS RETURN TO THE SAME SPOT IN BIMINI, THE BAHAMAS, TO GIVE BIRTH. The mysteries of this cyclical event are studied by The Field Museum's Kevin Feldheim, PhD, the A. Watson Armour III Manager of the Pritzker Laboratory for Molecular Systematics and Evolution.

Feldheim researches the mating systems and population biology of sharks using DNA analysis. Since 1996, he has collaborated with Samuel Gruber, PhD, of the Bimini Sharklab to identify individual lemon sharks through DNA testing. Together, with a team of researchers, they have determined that lemon sharks born in Bimini

eventually return as adults to give birth in the same natal nursery.

"Lemon sharks mature around 13 years, so only with this long term study, could we really answer the question of whether they return to the same place," explained Feldheim.

A new display in the Daniel F. and Ada L. Rice DNA Discovery Center presents Feldheim's research on the reproductive lives of sharks and examines how DNA analysis can help in the conservation of other elasmobranchii, the group of fish that includes sharks, skates, and rays.

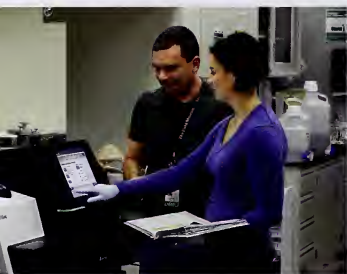
"One thing that we've been doing [in the Pritzker Lab] is using DNA to look at the genetic health of the sawfish population," said Feldheim.

Native to Florida, the smalltooth sawfish (*Pristis pectinata*) is a critically endangered species of ray. To help conserve remaining populations, scientists need more data on this enigmatic species.

Feldheim also studies parthenogenesis, a kind of asexual reproduction observed in sawfish in the wild and sharks in captivity. It is a phenomenon where offspring develop from unfertilized eggs. "We know it happens [with sharks] in captivity," explained Feldheim. "In the wild it's probably extremely rare. What we think happens is that it's a last ditch effort for females to pass on their genes."

In the Pritzker Lab, Feldheim and his colleagues have documented parthenogenesis in the whitespotted bamboo shark, the swellshark, and the honeycomb ray.

To learn more about the sex lives of sharks—and the role of the Museum's Pritzker Lab in adding to our knowledge—visit the new display in the Rice DNA Discovery Center when it opens in July. **ITF**



GN92106_063AD / JOHN WEINSTEIN

Kevin Feldheim and Erica Zahnle sequencing DNA in the Museum's Pritzker Lab (above).

A smalltooth sawfish (*Pristis pectinata*) found off the Florida coast (right) and a lemon shark in Bimini, The Bahamas (top of page).



FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION / GREGG POULAKIS



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RESTORING CORAL REEFS

in the Florida Keys

By Rüdiger Bieler, PhD, Curator, Integrative Research Center

AT THE SOUTHERNMOST TIP OF FLORIDA, THE FLORIDA KEYS NATIONAL MARINE SANCTUARY PROTECTS THE THIRD-LARGEST LIVING CORAL BARRIER REEF SYSTEM IN THE WORLD.

For many years, I have been researching the reef's invertebrate fauna, especially the Mollusca, the large phylum that includes species as diverse as oysters, octopuses, sea slugs, and conchs. Mollusks interact with other reef organisms in numerous ways:

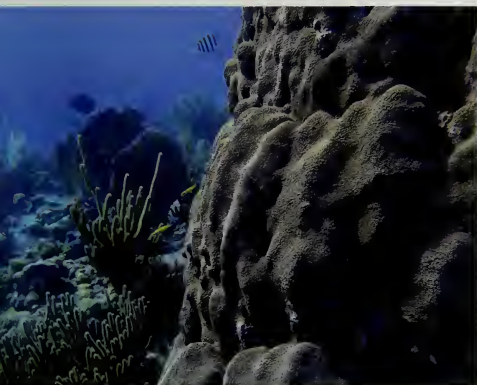
as grazers of algae and specialized predators of worms and corals; as filter feeders that contribute to reef structure by cementing to it; or as eroders that bore into coral rock. Most leave their shells behind, and a survey of "seashells" tells much about a reef's biodiversity, giving clues to this underwater ecosystem's overall health.

Multiple factors affect the health of coral reefs. Degraded water quality, including changing water temperatures, lead to "bleaching" events when corals lose vital micro-algae from their bodies. Nutrient runoffs from the land—mainly nitrogen and phosphorus from fertilizers—trigger rapid growth of larger algae that smother coral reefs. Diseases then can kill off already stressed individual organisms.

The hard coral cover that I admired during my first dives in the 1980s has largely disappeared. Monitoring the deterioration seems no longer enough, so my colleagues and I are now actively slowing down the reef loss. With Research Associate David Vaughan, PhD, of Mote Marine Laboratory, who developed a technique of re-growing hard coral coverage on dead boulders, we are now successfully replanting brain corals—hair plug style—for the first time—and at 25 times their normal growth rate.

We are also monitoring the developing fauna, including the mollusks, in the repaired reef. Are local species coming back? Or will invasive species take their place? How do we know what was lost during the decline of the hard corals? Understanding these changes over time requires historic data, but there have been no prior surveys. The trick is to reconstruct historic baseline data from museum collections, including those at The Field Museum. Using such data combined with extensive new field surveys will help us understand regional shifts in biodiversity, both man-made and natural. This is no small project—I am now tracking nearly 2,000 molluscan species! **ITF**

The Field Museum gratefully acknowledges the generous support of the Paul M. Angell Family Foundation for the Florida Keys coral restoration project.

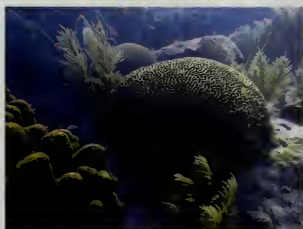


RÜDIGER BIELER

Healthy parts of the Florida Keys coral reefs (above and bottom).



PETRA SIERWALD



RÜDIGER BIELER

Rüdiger Bieler prepares a damaged section of the reef for new coral "implants" (center).

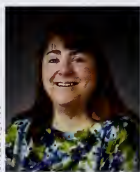


WOMEN SCIEN

DESPITE HISTORICAL BARRIERS, MORE WOMEN ARE ENTERING THE SCIENCES THAN EVER BEFORE. THE FIELD MUSEUM RECOGNIZES THE CONTINUING CHALLENGES and is working to expand opportunities for women in the sciences, especially among the many young women still determining their career paths. Currently, women comprise about 56 percent of the Museum's scientific staff, with 24 percent working as curators. The following provides a sampling of several and their research interests.

SHANNON HACKETT, PHD

Richard & Jill Chaifetz Associate Curator of Birds



GN92719_013D

I conduct specimen-based studies of birds. Currently, I am studying the parasites and pathogens that live in and on birds and how these potential threats might switch hosts. I collaborate with lots of people

throughout the world, including scientists at the Centers for Disease Control and Prevention, but my most important collaborators are here at The Field Museum, including my husband, John Bates, PhD. Our investigations of malarial parasites in birds and mammals have brought new insights into the substantial genetic diversity of these organisms and identified host switches between birds and mammals.

ABIGAIL DERBY LEWIS, PHD

Conservation Ecologist, Keller Science Action Center



GN92236_011D

I'm developing a conservation program for the monarch butterfly in urban areas throughout the Midwest. (See article on page 15.) Monarchs, with their iconic color pattern, strong cultural importance,

and spectacular migration, have long captivated children and adults alike. During the last several decades, monarchs, like so many other pollinators, have declined significantly. I'm working with an interdisciplinary team of anthropologists, biologists, ecologists, and geospatial analysts to help guide and inform where the best opportunities are to plant monarch habitat and the best strategies to do so in cities throughout the central flyway.

CORRIE MOREAU, PHD

MacArthur Associate Curator of Insects



GN91564_08D

Currently, I am sequencing the DNA and genomes of turtle ants to understand their evolutionary history and geographic distributions. My team is also sequencing the bacteria in their gut to understand the role these

bacteria play in the ants' plant diet. Our fieldwork takes place all over South America. Field Museum students, postdocs, and research assistants are collaborating with colleagues at several universities around the United States. So far, our research has demonstrated that turtle ants not only need their gut bacteria to process food, but have been coevolving with these bacteria for millions of years.

JANET VOIGHT, PHD

MacArthur Associate Curator of Invertebrates



GN91569_08D

I'm investigating deep-sea wood-boring bivalves, clams with teeth on their shells that bore into sunken wood. I've collected these animals from off the coast of California at more than 3,200 meters in depth. Right now,

I'm working to describe new species from specimens loaned from Harvard's Museum of Comparative Zoology and the Museum of New Zealand Te Papa Tongarewa. These animals have rarely been studied in the southern half of the world! The new species will help increase our knowledge of the bivalves' completely implausible habitat—sunken wood in the deep sea—and test my ideas based on patterns found in the Northern Hemisphere.

SCIENTISTS AT THE FIELD

Compiled by Christine Thom, Science Writer

Help Support Women in Science

The Field Museum Women's Board is a chief partner in the Field Museum Women in Science initiative. You can help support internships and fellowships for aspiring women in science by joining the Women's Board for the annual **Women in Science Luncheon**. The event will take place on **Wednesday, May 11 at 11am**. Sponsorship opportunities and tickets are available. For more information, email womensboard@fieldmuseum.org or call 312.665.7135.

WOMEN IN
SCIENCE

CORINE VRIESENDORP, PHD

MacArthur Director of Andes-Amazon Program,
Keller Science Action Center



GN92247-0102

At the time of this writing, I'm shoving gear into my backpack for our next rapid inventory. I'm leading a team of 25 biologists and social scientists—mostly experts from

South America—into an unexplored region of the lowland Amazon between the Putumayo and Algodón rivers in northern Peru. We'll spend a month surveying the plants, wildlife, soils, and water—and we'll learn about the indigenous people's aspirations for their future and their forests. We will use this information to help protect this place and its people. Our work has provided the scientific foundation for the creation of 37,117 square miles of protected areas in Bolivia, Ecuador, and Peru, including the Sierra del Divisor National Park in Peru. (See page 4.)

ALAKA WALI, PHD

Curator of North American Anthropology Collections



GN92247-0120

Currently, I am working to develop environmental conservation strategies based on local cultural practices. My colleagues and I are collaborating with community partners and NGOs in Chicago and Peru, discovering the diverse array of cultural practices that people draw upon to cope with significant

change. In the Amazon, we found that people incorporate rules for the use of natural resources into their myths, stories, and everyday work habits. These rules protect and maintain the high biodiversity. We have also documented how low-income communities in urban Chicago draw upon their cultural heritage to create strategies for low-energy consumption that can be models for reducing our carbon footprint. **ITF**



Corrie Moreau, PhD, studies the evolutionary history of turtle ants (*Cephalotes* varians), pictured here.



MILLIPEDES



the BRAIN SCOOP

with
EMILY GRASLIE

PETRA SIERWALD, PHD

Associate Curator of Insects

Visit The Brain Scoop on YouTube to see Associate Curator Petra Sierwald, PhD, discuss her research on millipedes.

PHOTOS: GN92092_0100 / KAREN BEAN (BIRD), GRACEN BRILMYER (TURTLE ANT)
iSTOCK.COM/SPXCHROME (MILLIPEDE). ALL PORTRAITS BY JOHN WEINSTEIN

RESTORING HABITATS,

Rice Native Gardens

By Carter O'Brien, Sustainability Manager

LATER THIS YEAR, THE FIELD MUSEUM'S GROUNDS WILL UNDERGO A HISTORIC TRANSFORMATION, thanks to the generosity of the Daniel F. and Ada L. Rice Foundation. The *Rice Native Gardens* will showcase the Museum's commitment to conservation and community, sharing the beauty and vitality of native plants and wildlife habitat with more than 3.5 million people who visit the Museum Campus annually.

The Museum will also provide leadership in integrating culture and nature all along the lakefront as envisioned in the landmark 1909 *Plan of Chicago*. The new gardens will add an important link to this green corridor, joining other native-species landscapes such as Northerly Island, the Burnham Wildlife Corridor, the Millennium Reserve, the Lurie Gardens, and new initiatives planned for Grant Park.

The Museum's history and mission will be at the forefront of this ambitious project. After the Great Fire, the explosive growth of Chicago provided lake-fill on which The Field Museum was eventually built. In this soil, newly planted bur oak trees will foster the growth of organisms, improving the soil's overall health, while core analyses will provide

research opportunities for Field scientists. The Museum conducted a baseline inventory of its grounds in 2014, and the recorded specimens and monitoring reports will provide a foundation against which to measure and communicate changes in biodiversity over time.

The *Rice Native Gardens* will also contribute to the Museum's LEED Gold rated operations and maintenance. The replacement of turf grass with native plants and permeable pavers will increase storm water retention and carbon absorption, reduce urban heat island effect, and improve the quality of stormwater draining into Lake Michigan by reducing fertilizer usage. After its establishment, natural resources requirements will greatly decrease, as native plants require watering only during severe drought.

Last but certainly not least, the Museum has brought neighboring communities into the design process. Their input will help determine landscape interpretation and educational programming, ensuring the gardens reflect Chicago's diverse cultures and enhance people's quality of life. **ITF**



Before and after...

The Museum's northeast lawn as it appears today (above). An artist's early rendering of how the Rice Native Gardens might appear (right).

SITE DESIGN GROUP



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Urban Landscapes for Monarchs

By Rebecca Collings, MS, Conservation Ecologist, Keller Science Action Center

THE ICONIC MONARCH BUTTERFLY IS IN TROUBLE. Over the past 20 years, researchers have documented a long-term downward trend in populations, with habitat loss appearing to be a major factor in their decline. Monarch butterfly habitat includes plants vital for their survival, such as milkweed, which larvae feed on exclusively, and various flowers that provide nectar for adults.



Monarch caterpillars (pictured, above) display a distinctive striped pattern and feed exclusively on the leaves of the milkweed plant (pictured, bottom).

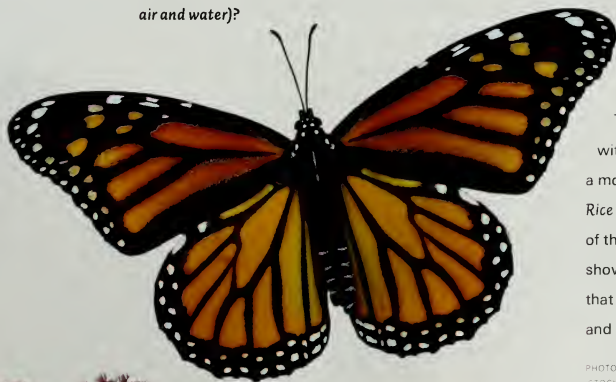
Restoring the butterflies' lost habitat is key to their conservation. Preliminary results from U.S. Geological Survey research indicate protecting the monarch will require all types of land to be part of the solution, including urban areas. The Field Museum is partnering on a year-long project with the U.S. Fish and Wildlife Service to answer some key questions about how best to conserve monarchs in urban areas. These include:

- How much can urban areas contribute to overall monarch conservation efforts?
- Where are the best places and what are the best ways to create monarch habitat within urban areas?
- What are the other benefits of creating monarch habitat in urban areas (such as beautification and cleaner air and water)?

To answer these questions, the Museum is working with the U.S. Fish and Wildlife Service and local partners in four cities along the monarch's central flyway: Chicago, Minneapolis/St. Paul, Kansas City, and Austin. Within each of these urban areas, the project team will identify the amount and types of potential habitat, from backyards to turf-dominated corporate campuses. They will also determine how much land is likely to be converted and create strategies for increasing the overall amount of habitat. The team will also develop models that other cities can use to create their own monarch conservation plans.

The Field is leading by example with the design and creation of a monarch habitat as part of the new *Rice Native Gardens* on the grounds of the Museum. The Gardens will showcase many of the plant species that monarchs need to survive and reproduce. **ITF**

PHOTOS: LAURA MILKERT (CATERPILLAR AND BUTTERFLY)
STOCK.COM/HERRELD (MILKWEED PLANT)

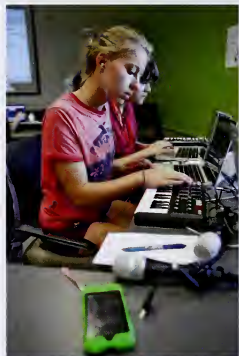


To learn more about monarch conservation and ways to get involved, visit monarchjointventure.org

Encouraging Curiosity

Grainger Digital Media Studio

By Eve Gaus, Digital Learning Manager



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"I definitely gained stronger team work skills and got to work with a great group of people my own age. I also had the opportunity to meet scientists and learn about the many different departments of The Field Museum."

OPENED IN 2012, THE GRAINGER DIGITAL MEDIA STUDIO ENABLES STUDENTS TO EXPLORE THE FIELD MUSEUM'S COLLECTIONS and scientific research initiatives through the lens of technology. In this youth-only space, teens can examine real objects, speak with scientific staff, and use digital media to tell Museum stories from their own perspectives.

Inside the Studio, the Museum's Digital Learning team engages students in hands-on exploratory learning, encouraging them to question their world and develop answers through critical thinking. The Studio allows teens to explore scientific and cultural topics in a space that welcomes creativity and unconventional questioning. Here, young people are at the center of the process, participating in activities designed to increase their knowledge of the Museum's research programs while simultaneously developing their social and emotional skills. Instructors use technology to encourage teens to exercise talents necessary for success in the 21st century, such as collaborative problem solving, creative thinking, decision-making, and innovation.

The Digital Learning team recognizes that learning isn't the same for every young person, and so instructors offer a variety of opportunities for teens to explore the Museum and the sciences as inspiration for their future academic choices. From curioCITY, a casual teen-only evening exploring careers in

science and culture, to Youth Council, an academic year-long program that works to infuse youth voice into the Museum, the Digital Learning team helps young people increase their appreciation of the natural and cultural worlds.

Stay up-to-date with Field Museum teen programs at fieldmuseum.org/teens or on our Facebook page "Teens Take The Field." **ITF**

The Grainger Digital Initiative is made possible with the generous support of The Grainger Foundation.

The Teen Digital Learning Program is supported by a grant from the Julian Grace Foundation.

PHOTOS BY KAREN BEAN



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Mighty Acorns

Exploring Outside The Field

By Meghan Forseth, Mighty Acorns Partnership Coordinator and Laura Fruhauff, AmeriCorps Public Ally Member

NEARLY OUT OF BREATH, A GROUP OF NINE FOURTH GRADERS EXCITEDLY GATHERS around a fallen tree, exploring every aspect of it with magnifying glasses and their dirt-covered hands.

"Look! Spiders! Millipedes! Cool! What is this?!"

The students who took part in this outdoor adventure are a part of the Mighty Acorns program coordinated by The Field Museum's Youth Conservation Action Team at the Keller Science Action Center. The program connects third to fifth grade students with their local ecosystems while supporting the Mighty Acorns' mission by encouraging understanding and appreciation of the natural environment among youth.

Each year The Field works with 20 partner organizations to enroll 11,000 Mighty Acorns participants from throughout the Chicago region. Students enrolled through the Museum embark on three field study trips within the Forest Preserves of Cook County, including Dan Ryan Woods, Eggers Woods, Beaubien Woods, and Sand Ridge Nature Center. While there, they explore the habitat, learn about the ecosystem, and participate in environmental restoration. Hands-on activities allow students to understand that they are not only connected to the ecosystem, but can play a huge part in its health.

Together, staff from the Museum's Learning and Keller Science Action Centers collaborated to revise the Mighty Acorns curriculum to reflect current science and language arts standards, as well as up-to-date scientific information. Mighty Acorns teachers rolled out the new curriculum during the 2015–2016 school year. When asked what motivated her participation in the Mighty Acorns program, one teacher said, "I love giving my students the opportunity to be in nature, not just as observers, but also as activists. They need the foundation for becoming lifelong stewards of the earth."



LISA SEE KIM

The Field works to inspire curiosity and wonder about the natural world, in part to help ensure that there are engaged and passionate youth and adults to help navigate complex environmental issues. The Mighty Acorns program is a vehicle teachers can use to get their curious students outdoors, fostering a relationship with their local ecosystem—one millipede at a time. **ITF**

The Mighty Acorns Regional Partnership is pleased to acknowledge major support from:



Sally Mead Hands Foundation

For more information,
visit mightyacorns.org



ALVARO DEL CAMPO

The First Emperor's Horses

By Franck Mercurio, Editor

DURING HIS REIGN, CHINA'S FIRST EMPEROR, QIN SHIHUANGDI [CHIN SHEE-WONG-DEE], COMMISSIONED THE CREATION OF NEARLY 8,000 full-sized terracotta figures, mostly warriors, to protect his massive burial complex located on the outskirts of modern-day Xi'an. Iconic images from this world-famous archaeological site depict row after row of soldiers, all ordered to stand guard outside the Emperor's mausoleum for eternity.



PHOTOS: © SHAANXI CULTURAL HERITAGE PROMOTION CENTER AND EMPEROR QIN SHIHUANG'S MAUSOLEUM SITE MUSEUM

Standing alongside these thousands of human figures are an estimated 670 terracotta warhorses. About 520 pull full-sized chariots. The remaining 150 are cavalry horses.

The current Field Museum exhibition, *China's First Emperor and His Terracotta Warriors*, includes one of these full-scale cavalry horses along with a cavalryman, charioteer, stable boy, and a number of other horse-related artifacts. Together, all of these finds

build a detailed picture of Chinese equestrian culture during the late third century BC.

In his successful bid to conquer rival states and unify China for the first time, Qin Shihuangdi utilized soldiers and archers on horseback.

Cavalrymen wore short, sleeveless armor to give them flexibility and mobility, while thickly padded tunics, trousers, and boots protected their bodies.



The cavalry horse had no stirrups, an innovation that would be introduced to China several hundred years later.

The burial complex of the First Emperor includes sculptures of people and animals, but also the remains of real ones. A figure of a stable boy was found near a pit filled with horse skeletons in an area probably intended to represent the imperial stables. The terracotta stable boy once held dishes filled with hay and grain to feed his horses in the afterlife.

The exhibition also includes two half-scale bronze models of chariots, each pulled by a team of four model horses that were buried in a pit near the Emperor's tomb.

Wooden chariots from this time have long since rotted away, so the bronze tomb models provide valuable insight into chariot construction and horse tack.



Learn more about the important roles that horses played during the Qin Dynasty by visiting *China's First Emperor and His Terracotta Warriors* before it closes January 8. For more information, visit fieldmuseum.org/warriors. **ITF**



This exhibition was organized by The Field Museum in partnership with the Shaanxi Provincial Cultural Relics Bureau, Shaanxi Cultural Heritage Promotion Center, and Emperor Qin Shihuang's Mausoleum Site Museum of the People's Republic of China.

Major Sponsors: **DISCOVER**  **Exelon** **UNITED** 

Empowering Women

The Field Museum Stores invite you to shop our collection of fair trade goods and other products that empower women and support artisans across the globe. Nourish the curiosity of a budding young scientist by gifting books that celebrate the scientific contributions of women through the ages. You can also inspire creativity with the exhibition catalog of *Women of Vision*.

Remember, Field Museum members receive a 10 percent discount on all Store purchases, and each purchase supports the Museum's public and scientific programs. As always, you can shop 24 hours a day at store.fieldmuseum.org.



RUTH NORTON, MCCARTER CHIEF CONSERVATOR

When someone of Ruth Norton's stature retires from The Field Museum, the void is enormous. Ruth was hired in 2001 as Chief Conservator in Anthropology. She rebuilt the conservation program from the ground up, putting together a wonderful professional staff and overseeing the renovation of the conservation labs to 21st-century standards. Among the major funded projects during her tenure are Tibetan thangkas, Chinese rubbings, and South American ceramics. When Ruth first started her work at the Museum, she began looking for funding to get the Malvina Hoffman sculptures conserved. Now that project, too, is successfully completed and on public display in the exhibition *Looking at Ourselves: Rethinking the Sculptures of Malvina Hoffman*. The Field thanks Ruth for her years of dedicated service and wishes her well in her retirement.

Ruth Norton with Shukran Mhd
Saliah Al Alwee, a participant in the
Iraq Cultural Heritage Project.



museum campus neighbors

ADLER PLANETARIUM

Explore space at the Adler Planetarium! Follow Apollo 13 Captain James A. Lovell Jr. to the Moon and back in **Mission Moon**. In the interactive **Community Design Lab**, hands-on activities challenge visitors to think about science—and the Adler—in new ways. In **What Is a Planet?**, learn how new approaches and perspectives in science can change how we define worlds near and far. Explore the largest of Pluto's neighbors in the Kuiper belt and hunt for a new ninth planet in the Adler's newest sky show, **Planet Nine**, opening May 28. Visit www.adlerplanetarium.org.

SHEDD AQUARIUM

Bring the family to Shedd Aquarium's **Amphibians** special exhibition for a game of real-life hide-and-seek. Look close for tree frogs the color of bark and spotted salamanders that recede into shadow and light. Even the three-foot Japanese giant salamander can hide in plain sight. Survival is all about camouflage, unless you're a tiny poison dart frog with bright warning colors. Welcome summer with the reopening of the outdoor **Stingray Touch** experience in May and another season of **Jazzin' at the Shedd** starting in June. For faster entry, buy your tickets online. Visit www.sheddaquarium.org.



The Field Museum salutes the people of Chicago for their long-standing support of the Museum through the Chicago Park District.

Official Airline of The Field Museum



events



LEARNING CENTER / THE FIELD MUSEUM

SUMMER EXPLORE STUDIO Gamesaurus Rex

Dive into the past when dinosaurs roamed and survival was a day-to-day game of chance. Combining exploration of game design and dinosaurian evolution, students will create a card game that is both scientifically accurate and fun to play. Ages 12–13. \$49, \$39 *members*. Scholarships available.

Mon–Fri / June 27–July 1 / 9am–2pm

FAMILIES / KIDS / TEENS / STUDENTS



LEARNING CENTER / THE FIELD MUSEUM

SUMMER DESIGN STUDIO Raptors in the Sky

In this video design workshop, teens will meet a live peregrine, go behind the scenes at the Museum, and speak with researchers and conservationists. They will then produce short videos inspired by peregrine falcons and research and conservation work at the Museum. Ages 14–15. \$99, \$79 *members*. Scholarships available.

July 11–29 / 9am–12pm

FAMILIES / KIDS / TEENS / STUDENTS



LEARNING CENTER / THE FIELD MUSEUM

DINO CAMP I spy a dinosaur! Do you?

Dino Camp is an early childhood camp designed expressly for young explorers ages 3–4 with their caregivers. Tickets are on sale now. \$76, \$67 *members*

- 1 Tuesdays / June 7 + 14**
- 2 Wednesdays / June 8 + 15**
- 3 Tuesdays / June 21 + 28**
- 4 Wednesdays / June 22 + 29**

SUMMER WORLDS TOUR

Summer Worlds Tour offers a week of adventures in Chicago's premier museums. Designed for children entering kindergarten through fifth grade in the fall of 2016. Please visit www.adlerplanetarium.org/camps to register. Registration is opens now! \$305, \$275 *members*

- 1 Monday–Friday / July 11–15**
- 2 Monday–Friday / July 18–22**
- 3 Monday–Friday / July 25–29**
- 4 Monday–Friday / August 1–5**

DOZIN' WITH THE DINOS Spend the night at The Field Museum!

Overnights are held on select Fridays and one Saturday from 5:45pm to 9am the following morning. Designed for families with children ages 6–12 years old. Registration for the 2017 opens July 1. Visit fieldmuseum.org/overnights for dates.

Standard Overnight: \$65, \$60 *members/groups*
Premium Package 1: \$78, \$68 *members*
Premium Package 2 + Tour: \$90, \$80 *members*

Select Fridays + one Saturday

FAMILIES / KIDS / TEENS / STUDENTS



LEARNING CENTER / THE FIELD MUSEUM

LEARNING THROUGH COLLECTIONS Professional Development for Educators

Join us on Saturdays this fall for professional development focused on working with museum objects and collections in your classroom. Learning can be hands-on, collaborative, and inquiry-based when you incorporate our Learning Collection items into your curriculum. FREE with pre-registration.

Saturdays / Sept 24 / Oct 15 / Nov 5 / 9:30am–12pm

ADULTS / EDUCATORS / FAMILIES



CURIOCITY

Join us as a Field Museum scientist and another professional from a seemingly unrelated career meet for the first time in front of a teen audience. Watch as their stories unfold, and see where their paths may intersect. FREE. Teens only. For more information, please visit fieldmuseum.org/at-the-field/programs/curiocity-0.

July 21

FAMILIES / KIDS / TEENS / STUDENTS

312.665.7400

312.665.7700

For event details, program registration, and to explore the Museum's full events calendar, please visit fieldmuseum.org/at-the-field.



LEARNING CENTER / THE FIELD MUSEUM

FIELD AMBASSADORS

Apply to be a Field Ambassador!

Field Ambassadors are educators who serve as liaisons between the Museum and their schools. The Ambassadors receive on-going professional development to learn best practices using Museum resources to support student learning. FREE. Applications accepted through July 1. For more information, visit fieldmuseum.org/at-the-field/programs/field-ambassadors.

ADULTS EDUCATORS



EMERSON BRAD - JOHN WEINSTEIN

WOMEN IN SCIENCE

Field Museum Women in Science is dedicated to inspiring, encouraging, and increasing participation of women in the sciences. Each month, the group organizes a lecture by a leading woman scientist. The theme of this year's lecture series is "enhancing and promoting diversity in science." All are welcomed to attend. FREE. For dates, times, and topics, visit fieldmuseum.org/about/employee-groups/women-science.

ADULTS EDUCATORS / FAMILIES



COURTESY OF MUSIC BOX THEATRE

CINEMA SCIENCE

In partnership with the Music Box Theatre, The Field Museum presents Cinema Science, a series of film screenings exploring scientific topics as depicted in the movies. Each month, a Museum scientist chooses a film that relates to his or her area of expertise and then discusses the film with the movie audience, post-screening.

Cinema Science takes place at the Music Box Theatre located at 3733 N. Southport Avenue in Chicago. Limited space available; advance tickets recommended. \$10

www.musicboxtheatre.com

For a complete list of upcoming movies, including dates and times, visit fieldmuseum.org/at-the-field/programs/cinema-science-music-box-theatre.

ADULTS EDUCATORS / FAMILIES



ANNEE DAVIS

DISCOVERY SQUAD

The Discovery Squad is a new program designed to enhance visitors' experiences through object-based learning, using artifacts or specimens from The Museum's collection. Volunteers engage visitors in a fun and entertaining way while teaching them what scientists can learn from these objects and their importance to The Field Museum's vast collections. FREE.

Fridays / 10am-2pm

FAMILIES KIDS TEEN STUDENTS

ADULTS



PEGGY MACNAMARA

PEGGY MACNAMARA

30 Years at The Field

From September 9 through October 15, the Evanston Art Center will host an exhibition of paintings by Field Museum Artist-in-Residence Peggy Macnamara. Peggy will present work from the past 30 years of her career, all inspired by the Museum's collections. An opening reception will take place from 1-4pm on Sunday, September 11. FREE.

Sunday / September 11 / 1-4pm

ADULTS EDUCATORS / FAMILIES

THE A. WATSON ARMOUR III RESEARCH SEMINAR

The A. Watson Armour III Research Seminar is The Field Museum's weekly academic seminar series. Talks are on Wednesdays at noon and feature speakers from around the world presenting topics related to the Museum's research and conservation activities. Talks are geared toward an academic audience, but open to members. For more information, visit fieldmuseum.org/armour.

ADULTS EDUCATORS / FAMILIES

65th ANNUAL MEMBERS' MAY 19+20 NIGHTS



GN92164.11ED / KAREN BEAN

Join us for our Annual Members' Nights on Thursday, May 19, and Friday, May 20, from 5–10pm. This is your only chance to explore areas normally off-limits to the public, talk to scientists and curators, and see parts of the collections not on display. There's a whole world behind the scenes that you won't want to miss!

We hope you can celebrate with us at Members' Nights. Reservations are required and space is limited. RSVP now at 312.665.7705 or by visiting fieldmuseum.org/memberevents.

Major Sponsor:



FIELD ENCOUNTERS

Donors to The Field Museum's Annual Fund now have the opportunity to tailor their learning experiences through the Field ENCOUNTERS program. Supporters can gain access to Museum programs and communications and stay in-the-know about topics of their choice.

Depending on your level of support, you may choose up to three Field ENCOUNTERS tracks. Choose from Human Sciences, Exhibitions + Public Learning, and Creatures + The Environment. Please contact Katlyn Hemmingsen at khemmingsen@fieldmuseum.org with questions.

• Exhibitions + Public Learning

Brittany Wheeler, Repatriation Specialist
June 13 @ 5:30pm

• Human Sciences

Cassie Pontone, Assistant Collections Manager of the Philippines Anthropology Collections
August 10 @ 5:30pm

• All three ENCOUNTERS tracks!

"Speed Science" featuring more than a dozen scientists
September 27 @ 5:30pm

Connect with The Field Museum online!

